Sand Mining Science Advisory Panel

Proposed Management Topics and Questions

For each Management Question, consideration should be given to both Central San Francisco Bay (Central Bay) mining activities and Suisun Bay and Channel (Suisun) mining activities. The Commission staff recognizes that there are significant differences between these two areas in both sediment transport processes and habitat characteristics, with the former being a more stable marine environment and the latter being a more brackish environment with significant seasonal changes related to fresh water flow.

A. Sediment Transport

1. Based upon on the existing data, the presentation and your expertise, please describe current sediment sources and transport of coarse grain sediments between Suisun Bay, Central Bay and the coastal near-shore sandy deep water shoals. What is the degree of certainty and/or variability of these connections. What is the role of tides and fresh water flows in this connection or exchange? What other environmental variables are important to coarse grain sediment transport? and ecology? How does the connectivity of the substrate affect or influence the biological community that inhabits it?
2. How would you predict the removal of large quantities of coarse grain sediment might affect the physical connections between embayments and the outer coast?
3. From the analysis completed to date, mining activities have been shown to change the bedforms and grain size of deep water shoals. What affect would these types of changes have on sediment transport and adjacent bedforms? What is the effect of deep pockets on sediment transport?

B. Replenishment and Cumulative Effects

1. The most recent USGS research and the analysis by Coast Harbor Engineering (CHE 2009) indicates that only a small amount (approximately 5%) of the material mined within the lease areas has been replaced by natural processes in Central Bay. The CHE analysis states that in Suisun sand appears to be arriving in the mining areas under transport from surrounding areas, (not from the lease areas; and that the net sediment transport along the existing pathways is not substantial. What are the mechanisms and likelihood that the sand shoals will be sustained, or even replenished over time?
2. What are the magnitudes and frequencies of storms or hydrological events necessary to move significant volumes of coarse grain sediment? And given the altered nature of the upstream system, are the necessary flows likely to occur?

3. What are the expected physical changes to the sandy shoal environment over time if extraction continues at a rate greater than replenishment?

C. Biological Connections with sand resources

1. Please describe the ecological community and associated foodweb found within a high energy marine sandy deep water shoal environment and a brackish deep water sandy shoal environment.
2. From the analysis completed to date, mining activities have been shown to change the bedforms and grain size of deepwater shoals. What affect would these types of changes have on the ecology of an area?
3. How connected are benthic communities in Bay and what are the potential impacts of sand removal from bedforms to adjacent benthic communities?
1. How would the biological community likely respond to the potential cumulative physical changes identified in the discussion of topic B?

D. Disturbance and Recovery

1. Describe the process of physical and biological community recovery after a mining event has occurred.
2. Please compare and contrast the physical and biological responses to natural disturbance events and mining events. Are there timescale differences? Does the frequency of events affect the recovery process? How might mining affect ecological resilience to natural disturbance?
3. What is the potential for recolonization from adjacent communities? (scale of connectivity)

E. Future Planning and Monitoring

1. How could sand mining activities be adjusted to reduce impacts to the sediment system?
2. Similarly, what mining strategies might reduce impacts to or increase resiliency of the ecology of the sandy deep water shoal environment, such as temporal or spatial restrictions?
3. What are the greatest uncertainties in the impacts of sand mining in San Francisco Bay? What type of monitoring or studies are needed to improve understanding of these potential impacts and how to best manage them?